

**6. On a Permian Brachiopoda, *Gemmellaroia*  
(*Gemmellaroia*) *Ozawai*, Subgen.  
et Sp. Nov., from Japan.**

By Sei-iti MABUTI.

(Comm. by H. YABE, M.I.A., Jan. 12, 1937.)

Several specimens of a highly specialized Upper Palaeozoic Brachiopoda dealt with in this note were collected by the late Dr. Y. Ozawa from a Permian limestone exposed at Yosinori, Ômine-mura, Mine-gun, Yamaguti-ken, and offered by him to Prof. H. Yabe for study. Most of the specimens are internal moulds and only one bears the original shelly matter on its surface. Carefully examined they show internal as well as external features very similar to those of *Gemmellaroia* Cossman,<sup>1)</sup> a genus with two species hitherto known only from the Sosio limestone of Sicily; they seem to represent a new species which diverges from its typical species in certain important structures perhaps worthy of subgeneric separation. The other fossils found at Yosinori in association with this interesting fossil are, *Leptodus* sp.,<sup>2)</sup> *Khmeria problematica* Mansuy,<sup>3)</sup> *Sumatrana annae* Volz, *Bigenerina sumatrana* Volz, besides many Pelecypoda, Gastropoda and Bryozoa yet to be studied.

Family Richthofeniidae Waagen

*Gemmellaroia* (*Gemmellaroia*) *ozawai*, subgen. et sp. nov. Figs. 1-11. Dimensions (in mm):

| Specimens              | I   | II  | III | IV | V    | VI   |
|------------------------|-----|-----|-----|----|------|------|
| Figures                | 5   | 6   | 7   | 8  | 9    | 10   |
| Brachial valve, length | 6   | 7.4 | 6.8 | ?  | 9.0  | 11   |
| " " , breadth          | 6.8 | 7.7 | 7.2 | 11 | 9.5  | 13.6 |
| Pedicle " , height     | 3   | 5.3 | 6.5 | 11 | 11.5 | 14.5 |

Pedicle valve irregularly conical, generally curved posteriorly and twisted to one side; shallow bowl-shaped with nearly circular outline when young (fig. 5). Often carrying trace of attachment to a foreign

1) *Megarhynchus*, Gemmellaro, G. G.: Sopra Due Nuovi Generi di Brachiopodi provenienti dei calcari con *Fusulina* della Provincia di Palermo. Giorn. Sc. natur. eccon. Palermo, 21, 1896, p. 8.

*Gemmellaroia*, Cossmann, M.: Errata et retification. Revue crit. Paléozool., 2, 1898, p. 77.

*Gemmellaroia*, Licharew, B. K.: Ueber einige seltene und neue Brachiopoden aus dem Unterperm des nördlichen Kaukasus. Pal. Zeitschr., 10, 1928, p. 274 (A).

*Gemmellaroia*, Licharew, B. K.: On some rare and new Brachiopods from Lower Permian of North Caucasus, Bull. Comm. Geol. Leningrad, XLVII, p. 292, pp. 261-293, Pl. XXIV, Figs. 9a, 9b, 1928. (B).

2) Ozawa, Y.: *Lyttonia* from Akiyosi, Jour. Geol. Soc. Tokyo, Vol. XXXIII, p. 307, 1926.

3) Yabe, H., and Ma, T. Y.: *Khmeria problematica* Mansuy from Japan. Jap. Jour. Geol. Geogr., Vol. X, Nos. 1-2, 1932, pp. 61-65. Locality erroneously printed as Yosinaga for Yosinori.

body by umbonal part; vary in cross section from nearly circular to transversely ovate; outside concentrically wrinkled and papillated, papillae apparently being scars of spines once attached; inside provided with radial ribs; cardinal area on its posterior face not distinctly marked off from the remaining part, extending from the apex of the conical valve to its articulation border with brachial valve and appearing as if being impressions produced by growth of the cardinal process of the latter. Two lateral septa at the inner side of the area never meet together, but strongly curve inwards so as to confine a myophore chamber separately from body chamber. Septa not extending to the hinge margin just as in *Gemmellaroia marii* (Gemm.).<sup>1)</sup> Neither with median septum nor median sinus.

Brachial valve round, flat, operculiform, without any hinge line, not sunken into pedicle. Cardinal process high, blade-like and bilobed. Two small diverging ridges raised from the base of cardinal process curve in and backwards, and equal in its antero-posterior length to  $\frac{1}{2}$ – $\frac{1}{3}$  of the diameter of valve. Median septum lying in front of cardinal process and between two curved ridges elongated almost as long as the latter.

Remarks:—The specimens at hand are very similar to *Gemmellaroia marii* (Gemm.), the genotype, only differing from it in the lateral septa which do not meet together to form such a true myophore chamber as well exposed by B. K. Licharew<sup>2)</sup> in that species. This difference seems to be so significant as to warrant the subgeneric separation of our form from the typical *Gemmellaroia*. As to the cardinal area, it is distinctly separated from the other part of the valve in Gemmellaro's figures of the Socio species, but not so much in the Japanese form and less so in Licharew's.<sup>3)</sup> According to the latter author,<sup>4)</sup> the Socio species<sup>5)</sup> has the pedicle valve radially ribbed on its inner surface as in the Japanese form.

The next allied genera are *Tectarea* Licharew,<sup>6)</sup> *Richthofenia* Kayser<sup>7)</sup> and *Prorichthofenia* King.<sup>8)</sup> The Japanese form differs from *Tectarea* in having separate lateral septa and lacking a median septum in pedicle valve, from *Richthofenia* in lacking a median septum in pedicle valve and by brachial valve not being sunken into pedicle valve, and from *Prorichthofenia* in possessing two lateral septa in pedicle valve.

1) Gemmellaro, G.: op. cit., 1896, Pl. A, Figs. 26, 27.

2) Licharew, B. K.: op. cit., 1928, (A), p. 279, Fig. 12b, (B) Fig. 9a.

3) Ditto, (A), p. 279, Fig. 12b, (B) Fig. 9a.

4) Ditto, (A), p. 279, Fig. 12a, (B) Fig. 9b.

5) The internal features of another species, *G. ornata* (Gem.) is yet to be studied.

6) Ditto, (A), p. 268, Pl. XI, Figs. 1–19, Text-fig. 11.

7) Waagen, W.: Salt Range Fossils, 1. *Productus* Limestone Fossils, IV, Fasc. 5, Brachiopoda, Pal. Indica, Ser. XIII, pp. 729–743, Pl. 82, 82A, 83.

Di-Stefano, G.: Le *Richthofenia* dei calcari con *Fusulina* di Palazzo Adriano nella valle del Fiume, Socio. Paleontogr. Italica, Vol. XX, pp. 1–27, Pl. I–III, 1914.

Stovanow, A.: On some Permian Brachiopoda from Armenia, Mém. Comm. géol. n. s. 111, pp. 30–33, 59–64, 1916.

Licharew, B. K.: op. cit., 1928 (A), (B).

8) King, R. E.: The Geology of the Glass Mountains, Texas, Pt. 11, Faunal summary and correlation of the Permian formations with descriptions of Brachiopoda. Univ. Texas Bull. No. 3042, 1930, p. 97.

Locality :—Yosinori, Omine-mura, Mine-gun, Yamaguti-ken.

Geological horizon :—*Sumatrina annae* zone ( $P_3$ ) of Ozawa;<sup>1)</sup> my *Leptodus* horizon.

Number of specimens examined 21; stored in the Institute of Geology and Palaeontology, Tōhoku Imperial University, Sendai, Japan. Reg. No. 58697.

Finally I wish to acknowledge my sincere thanks to Prof. H. Yabe for his various instructions and kind reading of the manuscript before publication, and to Messrs. S. Nomura, K. Ozaki and K. Hatai for their helpful suggestions.

#### Explanation of Figures.

- 1-3. Transverse sections of three pedicle valves showing two lateral septa.  $\times 2$
4. Longitudinal section of a pedicle valve parallel to the postero-anterior axis, showing the lateral septum in the pedicle valve and the cardinal process in the brachial valve.  $\times 4.5$
- 5a, 6a, 7a, 9a, 10a, 11a. Posterior views, showing the general form and the cardinal areas (7a, 8a, 9a) of seven pedicle valves. 5a, 6a, 7a, are young shells.  $\times 2$
- 5b, 6b, 7b, 8b, 9b, 10b, 11b. Lateral views.  $\times 2$
- 10c. Anterior view of the pedicle valve of an adult specimen showing the shell-layer with papillae and the inner ornamentation.  $\times 2$
- 5c, 6c, 7c, 8c, 10c, 11c. Dorsal views of seven internal moulds, showing the diverging ridges, median septa and inner ornamentation of the brachial valves.  $\times 2$
- 5d, 7d, 9d. Ventral views of three pedicle valves.  $\times 2$

---

1) Ozawa, Y.: Palaeontological and Stratigraphical Studies on the Permo-Carboniferous Limestone of Nagato. Pt. 11, Paleontology, Jour. Coll. Sci. Imp. Univ. Tokyo, Vol. XLV, Art. 6, 1925.

The fossils known from the same *Sumatrina annae* zone ( $P_3$ ) in the Akiyosi Plateau are :—*Mizzia velebitana* Schubert, *Glomospira* cf. *gordialis* J. et P., *G.* cf. *pussila* Geinitz, *Endothyra* sp., *Textularia* cf. *jonesi* Brady, *Bigennerina sumatrana* Volz, *Tetrataxis schellwieni* Ozawa, *T. linea* Ozawa, *T. conica* Ehrenb. var., *Fusulinella itoi* Ozawa, *Pseudofusulina ellipsoidalis* var. *orientalis* Ozawa, *P. granum-avenae* Roemer, *P. edoensis* Ozawa, *P. gigantea* Deprat, *P. exilis* Schwager, *P. douvillei* (Colani) (= *P. deprati* Ozawa), *P. crassisepta* Deprat, *P. ominensis* Ozawa, *P. suzukii* Ozawa, *P.* n. sp., *Stafella waageni* (Schw.) *Verbeekina verbeeki* (Geinitz), *Pseudodoliolina ozawai* Yabe et Hanzawa (= *Doliolina lepida*, auct.). *Neoschwagerina craticulifera* (Schw.), *N. douvillei* Ozawa, *N. margaritae* Deprat var. *nipponensis* Ozawa, *Cancellina schellwieni* (Deprat), *Yabeina multiseptata* Colani (= *Y. shiraiensis* Ozawa = *Y. hayasakai* Ozawa), *Sumatrina annae* Volz, *Lonsdaleia katoi* Ozawa, *L. gerthi* Ozawa, *Waagenophyllum frechi* (Volz), *W. akasakense* (Yabe), *Wentzelella timorica* (Gerth), *Chaetetes* sp.

